REMARKS

Attached hereto are a Request for an Extension of Time and the appropriate fee.

Applicant requests the courtesy of a telephone conference with the Supervisory Patent Examiner on the present amended claims and requests that Examiner Abdelwahed inform the undersigned attorney of an appropriate date and time.

The present invention is directed to a method of molding appendages for an elastic doll in the toy field and includes an elongated flexible metal core that will permit the doll appendage to be subjectly positioned to improve the lifelike characteristics of the doll. The metal core 10 extends substantially along the center of the molding spaces and can be fixed adjacent a shoulder portion of the arm to withstand the injection forces of a thermoplastic elastomer molding material.

A spacer made of a synthetic resin material can be positioned at a distal portion of the metal core and, as shown in Figure 1A and Figure 2, it can be placed, for example, at a distal end of the metal core. The spacer can be made of synthetic resin material such as a polyethylene so that the spacer can melt and become integral with the thermoplastic elastomer molding material. As noted on Page 11 of our specification, Line 20, through Page 12, Line 5, there should be ideally a temperature difference between the molding temperature of the molding material and the melting point of the spacer in order to insure the advantages of the present invention. For example, a thermoplastic elastomer having a melting point between 100° and 170° could be utilized while a polyethylene material with a melting point between 100°C and 130°C could be used.

It is recognized in the toy industry that the use of molten plastic in an elongated cavity such as the arm or leg of a doll will generally require higher pressure to push the plastic through the narrowed flow paths.

This is a relatively crowded industry, and there are tradeoffs that must be accomplished due to the economics and competitive pressures of making toy dolls. For example, increasing the melt temperature will increase the cooling time and thereby increase the part cost. Increasing the runner diameter increases the scrap rate and the tooling costs. Thus, the reality of this industry is that improvements that have a practical impact in such a crowded field are generally not obvious.

> Thus when differences that may appear technologically minor nonetheless have a practical impact, particularly in a crowded field, the decision-maker must consider the obviousness of the new structure in this light.
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> *Continental Can Co. USA Inc. v. Monsanto Co.*, 20 USPQ 2d 1746, 1752 (Fed Cir. 1991).

Attached hereto is a discussion of the injection pressures that would be applicable and must be taken into consideration.

In this environment, the present invention not only provides a spacer that annularly encircles a metal core rod or member, but further positions the metal core member so it will not be dislocated by fixing it at one end while positioning the spacer at the other end of the metal core.

As seen, for example, in Figure 7, the rod core's position relative to the injection of the molding material is provided so that it is both supported, for example, by a metal rod 24 and receives the flow of molten material traverse to its axial extension. As shown in Figures 6, 10 and 14, the metal core can be appropriately supported outside of the molding spaces so that a pair

of arms can be molded simultaneously with the interconnecting metal core removed, as shown in Figure 16B.

Since the spacer can be positioned at the end of the metal core and has radially extending projections, there is provided further support to prevent any dislocation during the high pressures of the injection of the molding material. The spacer also has the capacity to melt and become integral with the doll arm.

Thus, the prior art problems of a pin that could rupture the doll's skin and provide a safety hazard has been removed by the present invention.

The Office Action did not address the specific structural claim elements in formulating the rejection. Additionally, the combination of cited references fails to teach a method of providing a permanent core number in a doll appendage that is appropriately aligned by a spacer that melts into the molding material. The principal *Piotrovsky* reference does not teach a spacer that melts, and the Office Action has improperly misconstrued the actual teaching of this reference.

Claims 5-10, 19 and 20 were rejected as being obvious over a combination of the *Sato et al.* (Japanese laid-open Patent Application 61-169217) in view of the *Piotrovsky* (U.S. Patent No. 4,470,784), and further in view of the Japanese laid-open Patent Application 62-071616A to *Saburo*. Additionally, the Office Action noted an Acetal Technical Data Sheet indicating a melting point of 175°C. The Office Action did not dispute that there is no teaching in the *Piotrovsky* reference that would suggest that radially aligned pins are to melt. Rather, the suggestion is to provide ribs 74 in a cylinder boss 58 to enable the movement of a pin so that it collapses under the injection molding pressure. As can be readily determined, the *Piotrovsky* describes his invention as a collapsible pin assembly 56. See Column 3, Line 12. This is further

supported by the description on Column 3, Lines 27-39. Referring to Column 2, the suitable molding material is described as a polyvinyl chloride which can have a melting point of 176°. See attachment.

Thus, the *Piotrovsky* reference is not teaching a melting of a spacer member and certainly not of a spacer member having multiple radial extending projections for supporting a metal core. In fact, the Piotrovsky reference specifically teaches a molding insert 30 that includes an upper member 32 with an aperture 36 and a lower end 38 to form the "skeletal member" of armature 24. This insert 30 is shown as the armature of a doll leg. See Column 2, Lines 17-48.

The skeleton armature which is to give form to the soft material or flesh-like portion of the molded doll is also molded from the Acetal resin. Thus, the *Piotrovsky* reference <u>specifically teaches away from any melting of a spacer pin since that would in turn also ensure the melting of the skeleton support of the same material</u>.

The Office Action did not address the specific teaching steps for molding as described in Column 3, Lines 33-39, where it would only take one second to fill the mold and collapse the pins and six seconds to pack the mold to eliminate voids in the soft skin 68. The skin is cured in the mold for about 15 seconds while water is circulating around the mold cavity. Under these circumstances, the Office Action is wrong in contending that *Piotrovsky* has any teaching of melting a spacer.

The Board of Appeals confirms that any hindsight reliance through confidential access to an application being examined, in an attempt to arrive at the claimed invention under 35 U.S.C. § 103, is negated. See *Ex parte Clapp*, 227 U.S.P.Q. 972, 973 (Bd. of App. 1985), which states:

> To support the conclusion that the claimed combination is directed to obvious subject matter, <u>either the references must expressly or impliedly suggest the claimed combination or the</u>

> examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.
>
> (Emphasis added.)

It appears evident that the rejection is not built upon a teaching reference, but rather in hindsight from the present application since certainly the *Piotrovsky* reference does not suggest the features set forth in our claims.

The *Sato et al.* Japanese laid-open application is also a patent owned by the present Assignee, Takara Co., Ltd. As can be seen in Figures 4A and 4B, this reference teaches a composite skeletal frame or core member having an upper metal core 2 and a lower plastic attachment. Thus, the invention is a combination of the two materials to produce the end product shown in Figures 4A and 4B. There is no teaching of melting of any spacer pins 16 as can be seen in the final product. The molding temperature of the vinyl chloride resin is suggested to be between 170° and 180°C.

The present invention describes a step of injecting a molten molding material to melt the spacer so that the spacer becomes integral with the molting material. The *Piotrovsky* reference certainly does not suggest this feature, nor does the *Sato et al.* laid-open patent publication.

This leaves the *Saburo* laid-open Japanese Patent Application 62-071616A as the last possible teaching reference. This reference, however, which is also owned by the Assignee of the present invention, is directed to providing a soft resin material that can foam and provide a significant spongy or elastic feeling to a doll arm. To accomplish this purpose, first an exterior skin layer 2 is formed from a soft polyvinyl chloride resin by a slush molding technique or alternatively by a rotational molding technique. A second molding step is required wherein a coiled metal wire is provided as a flexible core member 6 within the formed outer skin without

any teaching of a spacer. Subsequently, a synthetic resin material is mixed with an expanding agent to create a foamed resin layer 3. Clearly, the *Saburo* reference is not teaching the concept of molding an arm for a doll in any manner similar to the teachings of the present invention as set forth in our present claims.

A conscientious examiner can sometimes use, unconsciously in hindsight, the teachings of an application to interpret the cited references in a manner to improperly provide grounds under 35 U.S.C. § 103 to reject a worthwhile invention. Clearly, none of these cited references are addressing or solving the problem defined and resolved by our present application. Using an objective approach of the actual problem solved to try and provide a proper prospective for the combination of references shows that present rejection is inappropriate. Looking at the specific references and, in fact, their true teachings, would find that the *Piotrovsky* reference teaches away from any melting of an Acetal resin since that would destroy the skeletal core that he desires. Additionally, the short time period of mere seconds in creating the molded arm also teaches away from the advantages of the present invention.

As can be determined from the attached injection pressure paper, by limiting the time of the product in the mold, the part cost is reduced because of the lesser amount of labor that is required. Neither of the laid-open Japanese applications addresses our solution of the problem nor provides a melted spacer, let alone a spacer of the configuration used in the method of the present invention.

Sato et al., Japanese Patent Application laid-open publication 61-169217, discloses a method of manufacturing an elastic doll member, such as a leg member, which includes a main body made of an elastic synthetic resin material and a composite core 1 embedded in the main body. The composite core 1 is constituted of a metal core member 2 and a synthetic resin core

member 3. The synthetic core member 3 is selected to be a resin that has rigidity at the molding temperature of a molding material for the main body or leg 25, and the synthetic core member 3 is merely embedded in the main body without being fused together with the molding material of the main body.

Actually, *Sato et al.* describes that the main body is made of a vinyl chloride resin. By injecting into the cavity of the mold members 20 and 21, the molten vinyl chloride resin at a temperature of 170° to 180°C, while the resin core member 3 of the composite core 1 is made of a polyacetal. However, *Sato et al.* clearly states that the core member has such a high molding temperature and such a high deflection temperature under load that the core member 3 will not be caused to be deformed even when the molten resin is injected. That is, the synthetic resin material for the resin core member 3 has a melting point higher than the molding temperature of the molding material for the main body, so that the resin core member 3 will not be melted together with the molding material for the main body during the molding of the main body.

In addition, the distal end 8a of the core extension 8 of the resin core member 3 protrudes from the bottom of the foot when the main body had been molded, as shown in Figs. 4A and 4B. Thereafter, the distal end 8a thus protruded is removed by breaking it off at a grooved portion 15 thereof. Accordingly, the molded product may have an undesirable mark or hole left thereon made by breaking off the distal end of the resin core member. This disadvantage is exactly the same one as that of the prior art as discussed in the second paragraph on page 2 of the description of the present invention. Thus, *Sato et al.* does not disclose nor suggest the claimed features of Claim 5 or 6 of the present invention.

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It is believed that the present claims are allowable.

If the Examiner believes that a telephone interview will be of assistance in the prosecution of this matter, he is respectfully requested to contact the undersigned attorney at the listed telephone number.

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on July 26, 2004.

By: James Lee

Signature

Dated: July 26, 2004

Very truly yours,

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Injection Pressure

The Injection Pressure that is required to push the molten plastic into an injection mold is similar to the force required to push play-doh through a toy extruder. There are many variables that affect the force required to inject molten plastic into a mold.

As the flow advances , the molten plastic begins to cool. The rate of cooling depends on the temperature of the melt as well as the temperature of the mold. As the plastic cools it begins to solidify onto the walls of the sprue, runners, gates, and cavities. The solidification of the plastic narrows the flow path. A higher pressure is required to push the plastic through the narrowed flow paths. The longer the plastic is in contact with the walls, the more solidification occurs. Eventually the thinner sections will "freeze off" and stop the flow. Thinner parts "freeze off" faster than thicker walled parts since less plastic is required to solidify. For this reason, thinner parts can be ejected earlier than thicker parts reducing the overall part cycle time.

Different plastics have different thermal properties and solidify at different rates. Different plastics also have different flow properties and flow at different rates under the same thermal conditions. These resin characteristics also affect the pressure needed to fill the cavity.

Longer flow paths take more time to fill. Since they take more time to fill, the plastic has more time to solidify. Therefore, longer flow paths require more pressure to fill. The addition of gates can effectively reduce the flow path length and therefore reduce the required injection pressure. All of these factors make it impossible to predict the pressure that will be required during the molding process without the use of mold flow analysis.

A typical molding machine is capable of generating 20,000 psi of injection pressure. This injection pressure is what drives the molten plastic from the screw through the sprue, runners, gates and then into the cavities that form the parts. When the injection pressure is exceeded by the pressure required by the part and runner system, the part will not fill. The list below shows the things that can be done to fix a tool that is exceeding the machine pressure capabilities. Note that all of the options cost time and money to implement!

- Increasing the melt temperature increases the cooling time and part cost.
- Increasing the mold temperature increases the cooling time and part cost.
- Increasing the runner diameter increases scrap rate and tooling cost.
- Increasing the part thickness increases material, cooling time, and tooling cost.

The use of mold flow analysis prior to building the tool will eliminate the need to make these costly changes after the tool is built.

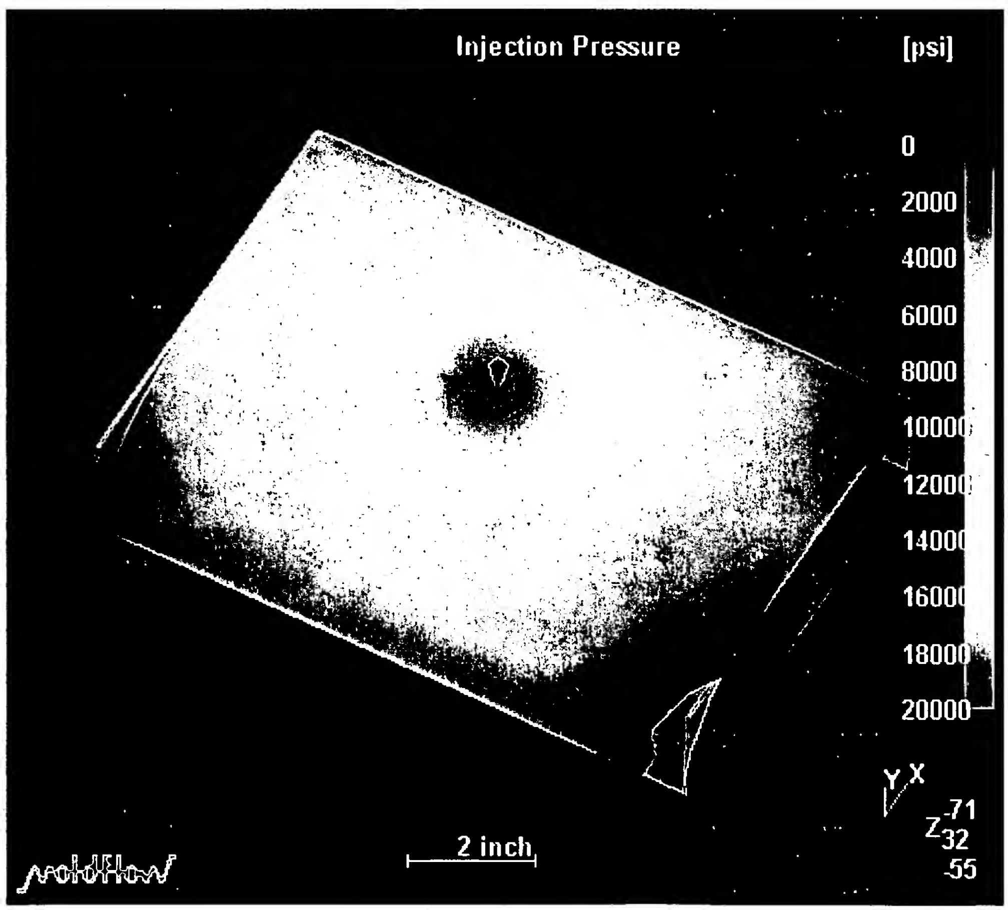
Example

The example part below is a coin tray that inserts into a cash register. The selected material is ***Vestolit 3257 PVC.*** The molders first choice was to gate directly into the center of the part with a heated sprue. If at all possible, the customer would like avoid using two gates due to the added expense. The objective of this exercise was to determine if the part could be filled with a single gate with the chosen PVC resin.

Injection Pressure Plot for Vestolit 3257 PVC

The injection pressure plot below was created by the analysis using the material ***Vestolit 3257 PVC***. As you can see, the part did not completely fill at the extreme corners and the pressure has reached the maximum limit of 20,000 psi. For this part, with one center gate, using the specified resin, the molder would experience a short shot. If the tool was built in this configuration the mold would not run with the chosen material. If mold and melt temperatures were set to their maximum the part may fill. However the process window would be extremely small, it would be hard to pack out the extremes of the part, and there would be a high likelihood of material degrade.

Since adding gates is the less desirable solution, there are two ways to fix the problem. Either the part wall can be thickened or a higher flow material can be used. Since the added material would increase the part cost and weight, it was decided that alternative PVC's would be investigated.

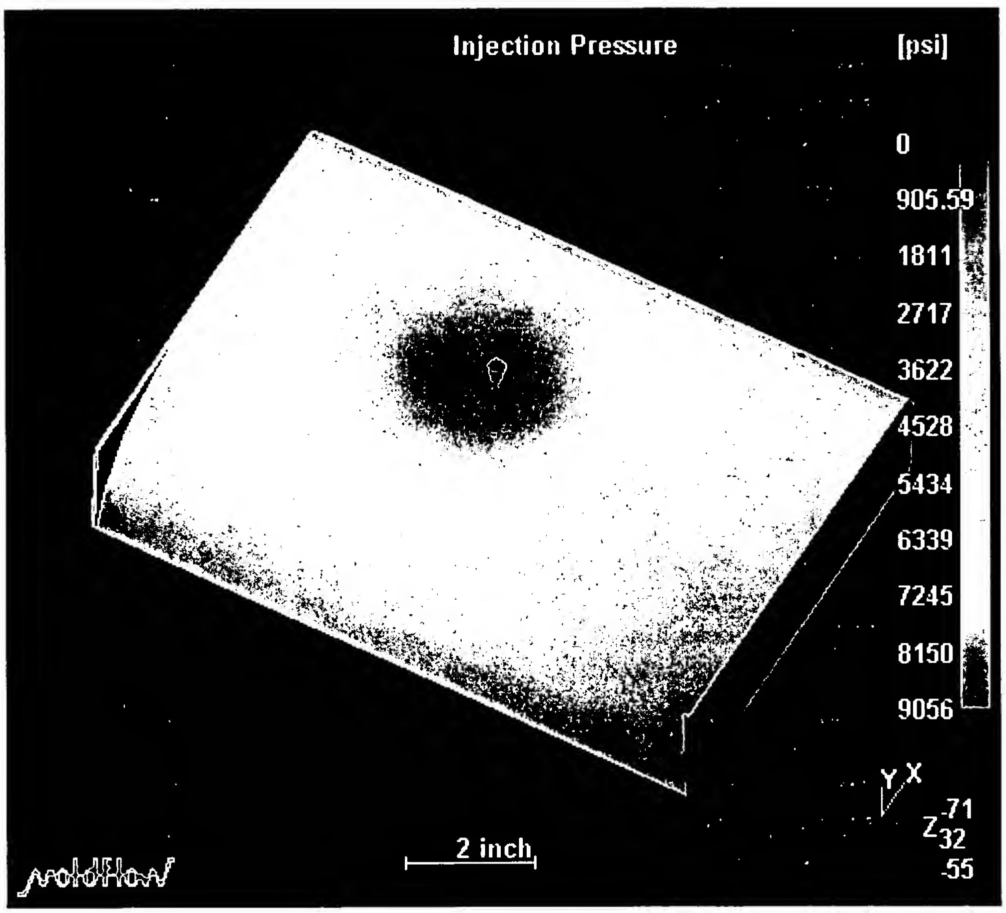


WARNING! Part will not fill as gated.

Injection Pressure Plot for Vestolit 9089 PVC

The injection pressure plot below was created by the analysis using material ***Vestolit 9089 PVC***. The injection pressure plot above is the two-gate hot runner option. As you can see, the injection pressure is still high exceeding 23,000 psi. This pressure is based on a theoretically perfect vented cavity, and does not account for the pressure drop through the runner system and gates. For this reason, the 2,000 psi that is remaining is not enough of a factor of safety to assume that this configuration will be moldable. Also, the required clamp force exceeded 615 tons.

The client did not want to use four gates due to the fact that the tool would be too expensive for the proposed volume. The client did not want to make the part thicker since that would increase the cost of the part beyond the target price. The molder did not know how to solve the problem. I asked him to see if the customer would consider using a different resin. The molder gave me the required material characteristics and we proposed a different material.



As you can see by the plot above, The new material with better flow characteristics filled the cavity using a single gate and a max injection pressure of 9056 psi. The remaining 11,000 psi will provide more than ample pressure to pack out the part. As you can see by the pressure plots, the choice of material can make the difference between filling a part and not filling a

part. The molder estimated that the analysis saved him over $2,000 in mold trial and material cost.

RPVC Rigid Polyvinyl Chloride

LEGEND
A = amorphous - Cr = crystalline - C = clear - E = excellent - G = good - P = poor - O = opaque - T = translucent- R = Rockwell - S = Shore

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STRUCTURE: A

SPECIFIC DENSITY: 1.35

WATER ABSORBTION RATE (%): 0.2

ELONGATION (%): 20

TENSILE STRENGTH (psi): 6500

COMPRESSION STRENGTH (psi): 11000

FLEXURAL STRENGTH (psi): 12100

FLEXURAL MODULUS (psi): 400000

IMPACT (IZOD ft. lbs/in): 5

HARDNESS: R105

FABRICATION
  - BONDING: G
  - ULTRASONIC WELDING: G
  - MACHINING: G

DEFLECTION TEMPERATURE (deg. F)
  - @ 66 psi: 170
  - @ 264 psi: 162

UTILZATION TEMPERATURE (deg. F)
  - min: 14
  - max: 140

MELTING POINT (deg. F): 176

COEFFICIENT OF EXPANSION: 0.000045

ARC RESISTANCE: 70

DIELECTRIC STRENGTH (kV/mm): 18
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TRANSPARENCY: C

UV RESISTANCE: G

CHEMICAL RESISTANCE
- ACIDS: P
- ALKALIS: E
- SOLVENTS: G

BACK